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Notes upon stamens of Solanaceæ.[1]

BYRON D. HALSTED.

(WITH PLATE XI.)

The stamens of the order Solanaceæ, so far as they have been examined by the writer, may be divided into those that dehisce by a pore at the top, those with a valvular dehiscence, and a modification of the latter where the wall of the anther breaks away irregularly, that is, peels off gradually midway between the dorsal and ventral sutures of the staminal leaf. Some of the Solanums, as S. tuberosum, S. rostratum, S. Carolinense and S. Dulcamara are examples of the first or terminal pore type; Lycium vulgare, garden Petunias and Daturas represent extreme forms of valvular dehiscence; while the tomato has a dehiscence midway between the two types; and the genus Physalis illustrates the form in which the wall of the anther-cavities peels off.

The stamens that open by pores have short filaments and long lance-shaped and very plump anthers, which fit closely around the style. The flowers are either pendent or hang laterally, so that it is not difficult for the pollen to make its escape through the hole at the top.

In Physalis they are of the same type. The Daturas have stamens with very long filaments, and the anthers are innate, plump, and when dehisced assume the shape of a spatula; while in Petunias it becomes apparently versatile and resembles a saddle when placed upright upon the rounded top of a hitching post. In color some are yellow, others white, and a few are purple, either in filament or anther, or both; sometimes striped. In short, there is a great variability, and at first there seems to be no constant structural feature. After a little work, however, has been done upon Solanaceous anthers, it will gradually appear that there is something distinguishing them from all others, and therefore characteristic. This resides in the peculiar fleshy central portion of the anther that may be called the "columella."

In the long upright anthers with pores, for example, the shape in cross section is like a butterfly with spread wings.

[1]Read before the Biological Section of American Association for the Advancement of Science, at Toronto, 1889.

In other words, the anther is divided into two prominent halves corresponding to the wings of the butterfly. The pollen bearing portion is in the form of a very broad horseshoe, while all between is cellular tissue. The wall enclosing this pollen layer often separates early from the columella, thus throwing the two cavities into one, while the valves themselves do not separate from each other as is the case with those which dehisce longitudinally.

This type is adhered to so closely that if we select the two most widely different stamens in size, length of parts, cohesion, dehiscence, etc., as Solanum Dulcamara and Lycium vulgare, it will be found that a sketch of the cross section of one, as shown in fig. 1, will answer almost perfectly for the other.

In some cases, however, there are apparent exceptions that are somewhat puzzling. In the Daturas, for example, if one studies the mature stamen he is surprised to find that the dehisced anther is quite flat and spatula-shaped, with very little to suggest a fleshy central core. The valves in opening have turned outward and backward until they meet their neighbor's valves back to back. In D. Tatula this is most evident, for in this species the valves are purplish blue and the central portion of the anther is without color, thus leaving a white strip in the center. However, by making sections of the young plump anthers before dehiscence the large columella is found present but composed of cells with thin walls which, when exposed to the atmosphere, quickly dry up to so small a space as to seem almost entirely absent in the dehisced anther. In fig. 2 at *a* is shown a transverse section through a young anther of a Datura flower with the narrow horseshoe of pollen-bearing tissue and inside of that the thin-walled parenchyma of the "columella." At *b* is seen a view of a similar section of a dehisced anther with the valves shrunken and turned back so as to present the spatula appearance of the anther when looked at sidewise.

The single large stamen of Solanum rostratum, with its beak-like appearance, is a giant among its fellows, but does not exceed them in the production of pollen, for while three or four times larger than the others, its thecæ are reduced to narrow curved lines of mother cells. The ordinary stamens, upon the other hand, possess unusually large cavities in which the pollen is borne. The giant stamen in cross-section is shown at *a* in fig. 3, while a similar section of an ordinary stamen is seen at *b*.

The almost infertile condition of the large stamen reminds one of the structure of the stamens of the cultured potatoes. In these, while large and plump, there is almost no pollen-bearing layer, and usually no apical pore opens for the discharge of pollen. In an article presented by the writer last year upon the low seed-producing capacity of potatoes, these plump but sterile stamens were looked upon as a sort of fatty degeneracy, brought about by high culture and the lack of any demand for seed production for the preservation of the plant under the conditions which obtain with potato growers.

The horse nettle (Solanum Carolinense) has a form of mature anther that was at first sight a marked variation from the type. It dehisces by a pore, and we should expect that there would be but a single pollen cavity for each half of the anther. Instead of this there are two, and a seeming tendency to produce four. The explanation is again found in the shrinking of tissue by drying, as may be quickly seen by comparing the old with young anthers. A section of a young anther is shown at *a* in fig. 4, and the position of the dried parts in a mature stamen is seen at *b*. The two thecæ do not become joined by the obliteration of the wall between them. But this septum is reduced by drying to a tough membrane, and the columella—not large in this species—is reduced in the same way to a slender projection, one upon each side, and into their respective thecæ.

In the species of Physalis the anthers open near the point of union of the valves, and the thin tissue coils upon itself and drops away not unlike the epidermis from a healing blister, exposing the pollen as a thin layer upon the thick and rather firm columella. This takes place in anthers that in form and position correspond to those with pores, but both the pores and the valvular dehiscence fail and this peculiar modification exists instead.

When we come to consider the contents of the theca, the uniformity is peculiarly constant in the order. There are some differences in color of the pollen, that is, while some grains are colorless others are tinged slightly with brown, and the markings upon some species are more prominent than others, but obscure at the best.

When dry (figure 5, *a*) the pollen is long egg-shaped, with three sutures. By the addition of water an almost spherical shape is assumed, and the outer coat, bearing whatever there may be of color and fine markings, becomes sep-

arated at those places corresponding to the infoldings when dry, as shown at *b*, fig. 5. In other words, the imbibition of water causes the contents to increase, and the somewhat collapsed outer wall is distended by the thin hyaline inner and continuous coat. This causes the separation of the three portions of the denser outer coat and brings into prominence the belts of the exposed inner walls. These belts are like broad meridians upon the sphere that reach from near one so-called pole to the other. Midway, or at what may be termed the equator, there is an evident circular spot called the pore, and from one of the three the pollen tube protrudes in germination. At this equator there are also two evident radiating belts for each pore, one on each side, and in the equatorial line, so that a direct view upon a pore often gives the appearance of a cross.

As the size varies in the order, and is quite constant for the species, the micrometer may become a material aid in classification.

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A new grass.

GEORGE VASEY.

(WITH PLATE XII.)

Among the plants recently collected by Dr. Ed. Palmer, at La Paz, in Lower California, is a grass which presents many peculiar and interesting points, and whose relationship is very obscure.

It is a diœcious grass, 8 to 12 inches high, of a rigid habit, with erect culms from a creeping rhizome; the rigid, pungently-pointed, conduplicate leaves crowded toward the base, with loose overlapping sheaths. The culms are branching below, and sometimes continue to emit short fascicled branches nearly to the panicle; indeed, the panicle itself, in the female plant, seems to be a succession of similar branches reduced and modified.

The male plants have a racemose-spicate inflorescence, consisting of a single terminal sessile panicle of 3 to 5 alternate approximate spikelets, which are ¾ of an inch long, or there may be an umbellate cluster of 2 or 3 such racemes, or several single lateral branches of the same, on pedicels an

inch or two long. These male spikelets usually have 10 to 15 flowers of the ordinary structure (fl. gl., palet and stamens) but with only one empty glume or none. In appearance they somewhat resemble those of Distichlis, or Uniola.

The fertile panicle is composed of a variable number (3 to 6) of lateral branches, which are approximate, and each one partly enclosed by the loose sheath of a leaf. These lateral branches, or flower-clusters, consist of a number of bracts, and one or more (3 or 4) fruiting spikes (sometimes a fruiting spike has only a small simple bract at its base) or there may be 2 or 3 alternate palet-like bracts, one of which contains in its axil a fruit spike, the other (at least sometimes) contains a small abortive branch, but they have two strong winged nerves, one to each side of the middle, as in an ordinary palet, but some of these have in addition smaller nerves between the large one and the margin. The fruit spike is linear, tapering to a sharp point an inch long or less, cylindrical, largest near the base, dense, and containing, imbedded in its substance, two linear seeds, one above the other, each 2 lines long, with no other covering, the two styles emerging through a small furrowed opening, and partly covered with a slender tongue proceeding from the body of the spike. The female fascicles seem to represent a much condensed branch, from which originate several fruiting spikes. These spikes do not, according to my observation, terminate a branch, but rather arise from the base and sides of a branch or rhachis, which terminates with an abortive branch.

Perhaps, in most if not all cases, from each joint of the rhachis arises one of these bracts, and encloses a fruiting spike and, between that and the bract, an abortive branch, or what I take to be such, consisting of a smaller palet-like bract flattened and the two sides overlapping and enclosing some more rudimentary bracts.

Sometimes the leaf-sheath of the fascicle answers for a bract and embraces a fruit spike, and also one of the small abortive branches or rudiments. What is the nature of this fruit spike? It is a spike with, most generally, two spikelets, each reduced to a single ovary with its two styles, the styles protruding from a lateral opening, and the ovary perfectly imbedded in the condensed tissue, which probably represents a flowering glume. Are there any analogous examples among grasses? There are several monœcious grass which have the female flowers almost completely enclosed in a bony envelope, of which a familiar example is Coix lachryma,

commonly called Job's tears. Here the female is at the base of the spike, enclosed in the globular envelope, which not only contains the female flower, but through which also passes the rhachis, which emerges at the apical opening with the styles, and is continued above giving rise to the male flowers. The bony covering is probably an indurated bract. But in this case all the usual envelopes of the flower are present. Another example is the Euchlæna luxurians or Teosinte, in which the female flowers are almost completely enclosed in indurated excavations of the rhachis: but here also the accessory organs of the flower are present. The case of Tripsacum dactyloides is very similar. If we could consider Coix as diœcious, or with separate spikes for the two sexes, we might have some analogy, but probably more analogy, if we could separate the sexes in Tripsacum and Euchlæna.

I sent specimens of this grass to Prof. Hackel, of Austria, and in a letter to me he states that it belongs to the genus *Jouvea* Fourn. This genus is described by Fournier from a female plant or plants collected on the sea coast of Mexico, by whom I know not. I have not been able to get access to the original published description which was made in the Bulletin of the Belgian Botanic Society, vol. 15.

Mr. Bentham in the Genera Plantarum admits this genus Jouvea with a query, and states that he had not seen the plant. It was considered by Bentham to be related to Buchloe and Opizia.

In Buchloe the outer glumes of the female spikelets are much indurated and closely enfold the flower, which however has the usual accessory parts. I can see no relationship with the new grass. Prof. Hackel, however, places Jouvea in the section Hordeaceæ, next to the genus *Monerma* R. & S., which genus by Bentham is united with *Lepturus* Br. It is at least closely related, and has hermaphrodite flowers, inserted in deep excavations on alternate sides of the rhachis or spike. In Jouvea, with which Mr. Hackel compares Monerma, the female plant is said to have the usual number of glumes in each spikelet, and the spikelets to be immersed half way in an excavation of the rhachis, the outer glume being cartilaginous and adnate for the half part to the rhachis. With the information at present at my command I do not see any relationship between this grass and the group in which it is placed by Prof. Hackel.

In Jouvea, as described by Fournier, the female plant has a rush-like habit, with short, acute, pungent leaves, and a

terminal spike or two spikes, with 2 or 3 spikelets, half way immersed in the spike, and with the outer glume adnate to it for half its length. One character of our grass is, so far as I know, unique, that is the slight attachment of the short spikes to the rhachis and their ready deciduousness. When mature they drop off at the slightest touch. If we may judge anything of the relationship of this grass from the male plants, it will clearly come near Uniola and Distichlis in Festucaceæ. The male specimens collected by Dr. Palmer are mostly old and mutilated, but there are some sufficiently preserved to show their structure. The same branching habit occurs as in the female plant, but the inflorescence is spicate-racemose, the spikelets frequently an inch or more long, and 10 to 15-flowered, mostly with but one empty lower glume; the flowers are distichously arranged, the flowering glumes lanceolate, acute, between 2 and 3 lines long, smooth, keeled, but with no lateral nerves. The palet is a little shorter, 2-keeled, and scabrous on the keels. The stamens are mostly fallen, but Mr. Holm found some flowers with two, and Mr. Coville found some with three.

In comparing this plant with Distichlis in the herbarium, I found a specimen of what is evidently the same plant, collected by L. J. Xantus in 1859–60 at Cape St. Lucas, Lower California, and ticketed by Dr. Gray as a variety of Brizopyrum spicatum (the old name for Distichlis), and in Dr. Gray's account of Xantus' collection in Proc. Am. Acad., vol. 5, with reference to this specimen, number 121, he says, "female specimens with the spikelets an inch and a half long, quite unlike any *Uniola spicata* Linn. met with on the eastern coast of the United States."

Although Dr. Gray took the plant to be the female, an examination shows it to be the male, and the spikelets are, as he says, an inch and a half long. There is reason to think also that a grass collected at the same time and place was the female plant corresponding. It is no. 119 of the collection, respecting which Dr. Gray says, "a new grass of uncertain genus, the single specimen mislaid."

Distichlis, as is well known, is dicœcious, but the female spikelets are like the male ones, except in containing ovaries and styles instead of stamens. The new species of Uniola (U. Palmeri), from the head of the Gulf of California, is also dicœcious, thus practically uniting Uniola and Distichlis, but in that species the male and female spikelets are also similar.

With my present knowledge of this grass, and its suggested

relationships, I am obliged to consider it a new genus, which I will designate by the name of **Rhachidospermum Mexicanum.**

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Grasses in the wrong genus.

W. J. BEAL.

In a recent study of our species of Aristida, Stipa, and Oryzopsis, it seemed to me best to slightly modify or extend the characters of the two latter genera and restore Nuttall's genus Eriocoma. In accordance with this plan, four species formerly placed under Stipa should take positions under Oryzopsis. I expressed my views in regard to such a position for these species in a letter to Professor F. L. Scribner, and to them he fully agrees. I present the descriptions of Stipa, Oryzopsis, and the four species in question.

STIPA L. Spikelets 1-flowered, on slender spreading pedicels or nearly sessile in a terminal panicle, rachilla articulate above the empty glumes: the two empty glumes narrow, peristent, membranous, keeled, unawned or rarely with a slender awn: floral glume narrow, rigid, rolled around the flower, usually with a curved short-pointed hairy callus at the base, and a terminal undivided bent awn closely and spirally twisted below the bend, sometimes with a tooth on each side the base of the awn, the awn tardily separating by a joint or rarely persistent: palea enclosed by the floral glume, 2-nerved: lodicules often 3 and large: stamens 3; anthers often tipped with a tuft of short hairs: styles short, distinct: caryopsis narrow, subterete, enclosed by the floral glume, but free.—Tufted, usually tall grasses, the narrow leaves often convolute or involute. The ciliate hairs on the stipe, aided by the twisting and untwisting of the awn, often bury the grain in the soil.

ORYZOPSIS Michx. Spikelets 1-flowered, usually ovoid or oblong, paniculate, rachilla articulate above the lower glumes, not produced above the flower, with a very short blunt or truncate callus: empty glumes 2, persistent, equal or the outer a little shorter, broad, obtuse or abruptly pointed, convex on the back: floral glume broad, shorter or longer than the other glumes, membranous becoming hard, ob-

tuse or truncate, usually producing a terminal caducous awn which is more or less loosely bent near the base: palea 2-keeled: stamens 3: lodicules 2, conspicuous: styles short or long, distinct: caryopsis oblong or ovate, enclosed by the hardened floral glume and palea, but free.—Tufted perennials; leaves broad and flat or narrow and involute; panicle terminal, lax.

O. Richardsonii. Culms rather slender, 5 to 9 dm. long: radical leaves scabrid, slender, 2 to 4 dm. long, those of the culm 3, flat or soon involute, the largest 2 mm. wide, the upper one 1 to 2 dm. long; sheaths much shorter than the internodes; ligule about 2 mm. on the lower leaves and 5 mm. on the upper: panicle exserted on the culm 2 to 3 dm., loose, slender, 7 to 12 cm. long, branches mostly in pairs, the longest 2 to 4 cm. long and bearing a few spikelets near its apex: empty glumes subequal, oblong, acutish, brittle when mature, mostly 3-nerved, 4 to 5 mm. long; floral pubescent, linear-oblong, becoming dark brown, about 3 mm. long; awn tortuous, slightly twisted, 9 to 16 mm. long.—*Stipa Richardsonii* Link.

O. Mongolica. A slender erect grass about 3 dm. high: leaves rigid, very slender, involute, those of the radical tufts half as long as the culm, those of the culm 2, 3 to 5 cm. long: the sheaths shorter than the internodes: ligule about 2 mm. long: panicle exserted, loose, few-flowered, 4 to 8 cm. long, the lower rays in twos or threes: empty glumes membranous, subequal, purplish, obtuse, 5 to 6 mm. long, first 3-nerved, second 3 to 5-nerved: floral glume slightly hairy, about 4.5 mm. long including the sharp almost obtuse callus and the 2-toothed apex; awn irregularly bent and plumose throughout, nearly 2 mm. long: palea as long as its glume or longer: stamens 3.—*Stipa Mongolica* Turcz.

O. caduca. Culms erect, rather stout, about 6 dm. high: leaves of the culm 3, smooth, involute, with long slender points, the second one reaching nearly to the base of the panicle, the third 12 to 18 cm. long, sometimes extending beyond the panicle; sheaths shorter than the internodes, ciliate on the margins; ligule 3 to 4 mm. long: panicle but little exserted, open, 10 to 20 cm. long, branches in twos and threes, the half whorls 3 to 4 cm. distant, flower-bearing along the upper third: empty glumes dull green, tinged with purple, equal or the first a little longer, elliptical-lanceolate when the apex is spread, strongly 3-nerved, 6 to 7 mm. long: floret elliptical, 5 mm. long from the short scarcely acute

callus to the joint of the awn, clothed with prominent silky white hairs over 1 mm. long; awn slightly twisted and bent, about 2 cm. long.—*Stipa caduca* Scribner. Collected by Professor F. L. Scribner at Sixteen-mile creek, Belt Mts., Montana, July 11, 1883.

O. Pringlei. Culms erect, rather slender, 6 to 12 dm. high: radical leaves numerous, half or two-thirds as long as the culm, scabrous, flat or involute, the largest 2 mm. wide, those of the culm 3, the upper one filiform, rigid, 3 to 6 cm. long; sheaths longer than the internodes; ligule 2 to 3 mm. long: panicle much exserted, open, thin, flexuose, 15 to 20 cm. long, branches slender, in twos to fours, some of them half as long as the panicle, bearing a few flowers above the middle: empty glumes equal, green on the back, brownish towards the thin margins and apex, elliptical-lanceolate, 5-nerved, 8 to 10 mm. long: floret lance-obovate, flattened, pubescent, becoming dark brown, 6 mm. long, callus blunt; awn irregularly bent, slightly twisted for the lower half, about 2 cm. long: palea firm, nearly as long as its glume: stamens 3.—No. 1410, C. G. Pringle, collected in Chihuahua, Mexico, 1887, and distributed as *Stipa Pringlei* Scribner.

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Preliminary notes on Perityle.

J. N. ROSE.

(WITH PLATE XIII.)

Bentham and Hooker, in 1876, assigned but two species to this genus in their "Genera Plantarum." When this genus was revised in the "Synoptical Flora" (1884) only ten species were recorded. In the last few years, especially through the explorations in Lower California, quite a mass of new material has been brought to light and the number of species has been doubled, besides adding a number of well marked varieties. I have not attempted at this time to make a complete revision of the genus, but to bring together the data which have come to light since the publication of the "Synoptical Flora."

I am indebted to Dr. Sereno Watson and Dr. Geo. Vasey for looking over this manuscript, and for the use of the large

collections under their control, viz., the Gray and National Herbaria; also to Dr. N. L. Britton for the Columbia College collection, especially the Torrey types; to Mr. E. L. Greene, T. S. Brandegee and W. M. Canby for specimens and the use of their herbaria.

Several of our Perityles have, until the present year, been almost unknown and considerably confused, but this last year, through the energetic labors of Dr. Edward Palmer and T. S Brandegee in Lower California, two of these rarities have been rediscovered and will require some shifting in the names as they now prevail.

The species of Perityle are quite variable and their limitation often uncertain. I have considered in the paper largely the P. Fitchii and P. Californica groups of Gray, and especially these two species.

I. P. Fitchii, and its near relative P. Brandegei, are readily distinguished from other Perityles by their 4-sided akenes, no pappus of either crown or awns; sometimes, however, a few akenes are found in the heads with but 3 and some 2 angles; rays white.

II. P. Californica, P. deltoidea and P. microglossa are readily distinguished from other species by the thick white callous margin of the akene, and yellow rays.

III. P. Emoryi and P. Greenei are difficult to separate from each other, but are easily separated from the above species The akenes are much flattened, 2-angled, the margin often densely hirsute and with a more or less prominent crown; rays white.

1. *P. incana* Gray, a well marked species only known from Gaudalupe Island, collected by Palmer and Greene.

2. *P. dissecta* Gray, and

3. *P. coronopifolia* Gray, are rare species not recently collected.

4. *P. Fitchii* Torr. One to two feet high, branching above, viscid pubescent: leaves an inch or less long, broadly ovate, doubly serrate: heads solitary on peduncles about an inch long, 5 to 6 lines high: disk corollas 2 lines long, slender, gradually passing into the proper tube: rays white, sometimes drying pinkish: style branches with slender acuminate appendages: akenes somewhat flattened, 4-angled, 1 to 1½ lines long, narrowly linear, faces smooth, angles slightly hirsute (in dry akenes) with straight appressed hairs (fig. 1).

Much uncertainty has existed with reference to this species. The type specimens collected by Rev. A. Fitch were very poor and imma-

ture. It is very uncertain where they were collected. The original label says "California," but Dr. Gray considered this a mistake and thought that it was probably from some of the islands. In the Synoptical Flora Dr. Gray doubtfully referred here as a variety, Palmer's Guadalupe Island plant (no. 44, '76). Mr. Greene has collected in the last few years from several of the coast islands and the Californian peninsula, and referred here a species more closely related to P. Emoryi. To Mr. T. S. Brandegee belongs the credit of collecting and identifying Torrey's old species and referring to it *Laphamia peninsularis* Greene. While studying Palmer's San Quentin plants, I had independently reached the same conclusion with reference to P. Fitchii, but did not recognize my plant as the Laphamia peninsularis. Since then, through the kindness of Dr. Britton, I have studied Torrey's specimen (the only type specimen in existence), and have confirmed Mr. Brandegee's conclusion that it is the same as L. peninsularis. The type is a mere scrap with half mature akenes, but it shows "the two approximate nerves at each margin," the style tips, and no signs of pappus, and has the close viscid pubescence. The following are the stations and collectors of this species: Rev. A. Fitch "California," in herb. Torrey; "Scammon's Lagoon," Lower California, unknown collector in herb. Cal. Acad. Sciences; Dr. Edward Palmer, San Quentin, Lower California (no. 706), Feb. 1, 1889; T. S. Brandegee, Purisima, Lower California, Feb. 12, 1889; T. S. Brandegee, Commondu, Lower California, Feb. 1889. From the above list of stations it may be seen that this species, which for 35 years has been almost unknown, is really a common species of the peninsula and is found on both ocean and gulf side, and has not yet been found on any of the islands. The bibliography is as follows: *Perityle Fitchii* Torr., Pac. R. R., Vol. IV, 100; Gray, Syn. Flora, Vol. I, pt. II, 321, excl. var.; Brandegee, Proc. Cal. Acad., 2d ser., Vol. II, p. 177, excl. var.; *Laphamia peninsularis* Greene, Bull. Cal. Acad., Vol. I, pt. II, p. 319.

5. **P. Brandegeana,** n. sp. A very similar species: stems 3 to 12 inches high, the smaller plants simple, the larger ones branching at base, glabrous below, somewhat glandular above: rays white: disk corolla 1½ lines long, abruptly contracted into the proper tube: style-tips obtuse: akenes linear, 1½ to 2 lines long, 4-angled, faces sparsely hispid, in dry akenes hairs coiled (fig. 2).

Lagoon Head, March 6 to 15, 1889, Dr. Edward Palmer. Abundant on sand beaches and hills contiguous to the ocean. Dr. Palmer also says it extends back 40 miles inland.

6. **P. Rothrockii,** n. sp. A somewhat similar plant, 4 to 6 inches high, branching, somewhat glandular: heads mostly on peduncles, sometimes 2 inches long: akenes 3-angled, the central ones by compression 2-angled, the angles hirsute, with the paleaceous crown lacerate.

Specimens in National Herbarium are labelled from Nevada, 1872, but Rothrock's Report says Arizona, and Dr. Rothrock writes me that he thinks it is most likely from Nevada. Probably *P. Emoryi* Roth. in Wheeler's Report, p. 166, excl. descr., and Watson's Catalogue of the same.

7. *P. Californica* Bentham. Slender, erect, more or less branching, almost glabrous below, pubescent and a little glandular above: leaves opposite, the upper ones alternate, broadly ovate or suborbicular, coarsely dentate or incisely lobed, truncate at base: rays yellow: corolla (1¼ lines long) abruptly contracted into a short and very slender tube: style branches short and obtuse: akenes less than a line long, with a thick callous hirsute margin: pappus a paleaceous crown, constricted at base, its summit lacerate, and a single awn longer than the akene, barbellate throughout (fig. 3).

Hinds (1837) and Brandegee (1889), Bay of Magdalena, Lower California. The history of this species is curious and interesting. It was collected first in 1837 at Magdalena Bay and described (with plate) in the Bot. of the Sulphur, by Mr. Bentham in 1844. Nothing more is said of it until 1862, when Dr. Gray in Proc. Amer. Acad. refers Xantus's specimen from Cape St. Lucas to it, and in the Botany of California he still refers to those two specimens as representing all of P. Californica. In the Synoptical Flora, however, he refers Xantus's specimen, his only representative of P. Californica, to P. microglossa, and takes up P. Emoryi for that species (P. Californica). And now, this past season, Mr. Brandegee has collected at the original station the true form of Bentham's species, which will require the referring back to P. Emoryi the P. Californica of all modern authors. There is still one point which is a little confusing: Mr. Brandegee's specimens are slender and not much branched, while Bentham's figure resembles some forms of P. Emoryi. But as Mr. Brandegee's specimens show the exact akenes with their thick callous margin, peculiar crown, and awns, and the yellow rays of Bentham's description and figure, it seems to be the true P. Californica. Should the habit (a most valuable thing in this genus) dominate, it would require a new name, otherwise the old and familiar name is taken up.

Bentham, Botany of the Sulphur, p. 23: Gray, Botany of California, excl. Xantus's plant: Syn. Flora, Vol. I, pt. 2, 321, in small part.

8. *P. deltoidea* Watson. Very near to P. Californica in habit and in the akenes, but the latter have a somewhat different crown and there are slight differences in the corolla and style tips. Collected in Lower California, Los Angeles Bay by Palmer, and about Commondu by Brandegee. Wat-

son, Proc. Amer. Acad. 24. 57: Brandegee, in part, Proc. Cal. Acad., 2 ser. 2.177.

9. *P. cuneata* Brandegee. Probably finds its closest relationship with the two above species. It is peculiar in its cuneate or spatulate akenes. Lower California, Brandegee. Published in *Zoe*, 1.54.

10. *P. microglossa* Benth. The second species of the genus. This and the three preceding are the only ones which possess the thick callous margin of the akenes. Gray (Syn. Flora) describes the akenes as follows: "Akenes obovate or obovate-oblong, with broad summit, villous-ciliate margins, and a pair of delicate awns, which barely equal the breadth of the akene, and are twice or thrice the length of the crown of squamellæ. The awn under high power is a little scabrous; akene $\frac{3}{4}$ line long (fig. 5).

It differs from P. Californica in the length and the character of the awns, and the shorter crown. The bibliography is fully given by Gray in Syn. Flora. Only two stations are known for the typical form, within our borders; collectors, Lay, Collie, and Coulter. Parish's plant, referred here by Gray, goes to P. Emoryi. In Lower California[1], Realego, the original station (Hinds); Cape St. Lucas (Xantus); Mexico, near San Luis Potosi (Palmer). The var. *effusa* Gray has only been collected by Pringle in Arizona.

11. *P. plumigera* Gray. Only known from Thomas Coulter's collection. Has its nearest relationship with the following species, of which Dr. Gray thought it might be a form.

12. *P. Emoryi* Torr. Mostly tall, a span to 2 feet high, erect, more or less branching, glabrous, or often hirsute and glandular above: leaves cordate in outline, 5 to 9-cleft, sharply serrate: rays white: akenes $1\frac{1}{2}$ lines long, straight, cuneate-oblong, margin hispid-ciliate, the small crown with a ciliate border, not constricted at base: the pappus a single slender awn, of the length of the akene, barbellate at apex: but in var. *nuda* Gray without awn, in other respects like the type, with which it is generally found, and is the common form. The faces of akenes are generally glabrous, but sometimes puberulent (fig. 6).

Emory's Report (1848), 142; Gray, Botany of California, 1. 396; Synoptical Flora, 1. 321, in part. *P. Californica* Watson, Proc. Am. Acad., 24 57.

The synonymy of var. *nuda* Gray is as follows: *P. nuda* Torr. Pacif. R. Rept. IV, 1000: Hemsley, Biologia Cent. Amer., 4. 142. *P. Califor-*

[1]Palmer has recently (Feb. 5) collected it in great abundance at La Paz.

nica Benth., var. *nuda* Gray, Syn. Flora, 321. *P. Fitchii*, var. Brandegee, Proc. Cal. Acad., 2 ser. 2. 177. *P. microglossa* Gray, Syn. Fl., 322, as to Parish's plant.

In Palmer's 562 from Los Angeles Bay, the akenes are broader and margins densely villous, and it has somewhat spreading branches.

To this species I doubtfully refer a plant collected by Orcutt (1886), near Rosario, Lower California, of a very branching habit, akenes a little curved, with very minute or no crown: and while the akenes are mostly 2-angled, they are often 3 or 4-angled in the same head.

P. Fitchii, var. of Mr. Brandegee, seems to be a form of this species. It has the same slender corolla (1½ lines long) and similar style-tips and crown, but no awns. The akenes are, however, a little curved and the faces a little hirsute.

Mostly in the desert regions of S. W. Arizona and S. California and extending as far south as Los Angeles Bay, and Magdalena Bay, Lower California. We have examined the following specimens: California (Bigelow, Parish); Colorado Desert (Schott, Orcutt); San Clemente Island (Nevin & Lyon); Yuma (Lieut. De Barry, Maj. G. H. Thomas); Arizona, Grand Cañon (Gray); Ft. Mohave (Cooper, Palmer, J. G. Lemmon and wife); Rio Colorado (Newberry, Parry); Lower California, San Telmo (Orcutt); All Saints Bay (Miss Fish); Magdalena Island (Brandegee, 1889); San Quentin (Palmer, 1889); Los Angeles Bay (Palmer, 1887).

Var. **Orcuttii**, n. var. Mr. C. R. Orcutt has collected in Cañon Cambellos, July, 1884, a slender form with small leaves, akenes with small crown or none, and often with faces quite pubescent. Also at Santa Maria, T. S. Brandegee, May 14, 1889.

13. **P. Greenei**, n. sp. Varying from 1 inch to a foot high: small plants erect and simple, large ones much branched and spreading, more or less resinous-viscid: leaves smaller, cordate or sometimes cuneate at base, serrate: corolla swollen, abruptly contracted into the proper tube, the lobes broadly ovate: styles acute: akenes 1¼ lines long, obovate, oblong, nearly straight, flattened, 2-edged, with margin hispid-hirsute: crown of united squamellæ lacerate: awns wanting or single (fig. 7).

A species very closely related to P. Emoryi. Mr. Greene says they can be easily distinguished in the field, this being strongly aromatic, while the other is scentless. Collected on Santa Cruz Island by Mr. E. L. Greene, July and August: Cedros Island, Dr. Veatch, Dr. Sheets, December, 1876; Greene, April, 1885; Dr. A. Kellogg (in herb. Gray); Palmer, 1889 (707, in part): San Benito Island, Lieut. Pond, 1889; Dr. Palmer, 1889 (no. 914): San Bartolome Bay, Lieut. Pond, March, 1889. I have seen most of the above specimens, with the exception of the last men-

tioned. This species is limited to the islands. The bibliography is as follows: *P. Fitchii* Greene, Cal. Acad. of Science, 2. 403, and Pittonia, 1. 205, 265, 291. *P. Californica* Vasey, Proc. Nat. Museum, Vol. 11, 368.

14. **P. Grayi,** n. sp. A species very close to P. Greenei in habit but more glabrous: stems mostly low and much branched: akenes barely over a line long, oblong, somewhat falcately oblique, with a short pappus of numerous squamellæ united into a small crown, with an erose denticulate border, margin minutely hirsute, faces more or less puberulent: awns mostly wanting, sometimes one (fig. 8).

Palmer, Guadalupe Island, 1875 (no. 44), 1889 (891), and Cedros Island, 1889 (no. 701, mostly). *P. Emoryi* Watson, Proc. Am. Acad., 11. 116. *P. Fitchii,* var. *Palmeri* Gray, Syn. Flora, 321. To this we refer Palmer's plant from Cormandos Islands (1888), which has the same akenes and crown, but of more slender habit, and minute leaves.

15. *P. leptoglossa* Gray. Supposed by Gray to have been only collected by Dr. Coulter. His label says it was "California," but Dr. Gray thought it was more probably Arizona, and it seems more likely not found within our limits. I find in the National Herbarium this plant from Guaymas, Mexico, collected by Dr. Palmer in 1869. The species is peculiar in the slender proper tube of the corolla, and the long and narrow cylindrical throat. The akenes a line long, linear oblong, with a conspicuous crown of squamellæ; awn single, longer than the akene, slightly scabrous.

16. *P. microcephala* Gray is a Mexican species collected by Pringle and Palmer. Proc. Amer. Acad. 21. 391,

17. **P. Socorrosensis,** n. sp. Apparently an annual, slender, ascending, with a close appessed somewhat glandular pubesence: leaves very variable, small, 6 to 10 lines long, equalling the petioles, ovate to broadly triangular, the base cordate to even reniform or above with more or less cuneate base: heads mostly on peduncles an inch or two long: rays white, small, 3-toothed: disk flowers slender, 1½ lines long, its proper tube forming half its length: style branches broad with acute tips: akenes spatulate-oblong (1½ lines long), with ciliate margins, no crown (sometimes mere vestiges of squamellæ), and two unequal awns from opposite angles, tipped with the remains of the style (fig. 9).

A very peculiar Peritylе with much the appearance of P. leptoglossa, resembling P. Fitchii in having akenes tipped with the base of the style and no crown, while the akene more resembles P. Emoryi. Collected by

Mr. Townsend, of the Albatross, at Socorro Island, about 200 miles off Cape St. Lucas, Lower California.

18. *P. Palmeri* Watson. Guaymas, Mexico (Palmer); Lower California at Commondu and Purisima (Brandegee). Watson, Proc. Amer. Acad. 24. 37. Brandegee, Proc. Cal. Acad., 2 ser., 2.177.

19. *P. Parryi* Gray. Collected by Parry, Havard, and recently by Pringle.

20. *P. Vaseyi* Coulter, ined. A new species from Texas (Nealley). Nearest P. Parryi, but of very different habit and foliage.

21. *P. aglossa* Gray. Only known from the cañons of the Rio Grande (Parry).

22. *P. Jaliscana* Gray. Collected by Palmer in 1886, in the State of Jalisco, Mexico. Proc. Am. Acad. 22. 431.

EXPLANATION OF PLATE XIII.—All figures × 20. 1. P. Fitchii (Palmer's San Quentin coll. of 1889). 2. P. Brandegeana (Palmer's Lagoon Head coll. of 1889). 3. P. Californica (Brandegee's Magdalena Bay coll. of 1889). 4. P. cuneata (Brandegee's Lower California coll. of 1890). 5. P. microglossa (Palmer's 1093 from Mexico). 6. P. Emoryi, var. (Orcutt's Colorado Desert coll. of 1889). 7. P. Greenei (Palmer's San Benito Isl. coll. of 1889). 8. P. Grayi (Palmer's Guadalupe Isl. coll. of 1889). 9. P. Socorrosensis (Townsend's Socorro Isl. coll. of 1889).

Department of Agriculture, Washington, D. C.

BRIEFER ARTICLES.

An international congress of botanists.—The idea occurred to the writer some time ago that the action of a number of societies, representing widely different interests, preparatory to taking advantage of the influx of visitors at the World's Fair three years hence, in order to secure representative gatherings of international character, might be imitated by the botanists to their great advantage and the furtherance of science. After some deliberation the matter was communicated by letter to a number of botanists, nearly a score in fact, with a request for their opinion. The answers have been almost uniformly favorable to the project, and in the majority of cases even enthusiastically so.

With one possible exception I have received no intimation of doubt about the great value and desirability of such a meeting. The buts and ifs are chiefly directed to the possibility of securing the attendance of foreign botanists whose presence is necessary to give sufficient weight to the deliberations of the congress to make the conclusions reached of universal acceptance. If this difficulty can be successfully met the minor ques-

tions of time and place of meeting, topics to be discussed, etc., will be easily settled.

Did Europeans think as little of crossing the Atlantic as Americans do, the matter of attendance would lose its threatening aspect. The World's Fair can not be expected to solve the problem, although it can be made to contribute something to that end. Some reliance can doubtless be placed upon the reputation of the country for its wonderful natural, social and political features. Something may be expected from offering an attractive excursion. And much can undoubtedly be done by personal invitation from American botanists to their foreign acquaintances and correspondents. In some cases there will probably be opportunity of giving these in person, as there are three intervening seasons for vacation travels, during which a number of botanists will doubtless cross the Atlantic. A personal presentation of the matter along with the invitation will have much more weight than a simple general invitation.

The time of the meeting must necessarily be in August or September, as these are the only months that all university teachers are disengaged.

The place of the meeting might conform to that of the A. A. A. S., although there are good reasons for having it at a different time and place. At any event it would probably be best to hold it at some other place than Chicago, as also suggested by Professors Penhallow and Scribner. My own preference would be for Philadelphia or Washington. If it were not for the heat, Washington would certainly be in many respects a most attractive place of meeting.

Professor Farlow observes in his letter that "when a foreign botanist makes up his mind to come to the United States he counts upon seeing California, the Yellowstone and the western country generally; and to see all these regions requires a great deal of time and money. It seems to me that foreigners would be disappointed if they only saw the country between New York and Chicago, and few could afford to pay their expenses to distant points." Next to the problem of securing the desired attendance, I think the question of excursions and entertainment the most difficult. It is evident that not much can be done without the use of a considerable sum of money. Excursion rates could doubtless be obtained, which would enable most American botanists, who so chose, to be of the party; but to secure money enough to pay the expenses, or even the railway fare of foreign visitors across the continent and back would require much exertion. Possibly some means may be found of meeting these expenses aside from direct contributions of money.

As to the extent of the excursion, both time and money will necessitate moderation in laying the plans. It seems, however, that the chief trip should extend at least as far west as the Yellowstone Park. The southern part of the country can be left out with good grace, considering the fact that the time will be the hottest part of the year in all probability. But these matters can be discussed later.

If a full expression of opinion can be had through the journals, or otherwise, the Association meeting at Indianapolis will give opportunity to arrange plans and effect an organization.—J. C. A.

Relation of light to epinasty in Solanum tuberosum.—In his article on Epinasty and Hyponasty, in the *Annals of Botany* (August, 1889), Vines catalogues certain experiments which indicate that epinasty is stimulated in the case of Helianthus annuus rather by absence of light than by its presence—thus offering a criticism upon the well-known photo-epinastic theory of Detmer. A specimen of Solanum tuberosum growing in the plant-house of the University of Minnesota has seemed to present some interesting evidence in the same line. A plant of the Solanum, about fifteen centimeters in height, was exposed to diminished and one-sided illumination for a period of twenty-four hours and pronounced epinastic curvatures resulted. When in the plant-house the shoot and leaves of this specimen were growing under the influence of strong direct sunlight augmented by reflection from the snow and by the southerly exposure. When removed from the house the plant was placed in a lecture-room lighted by three large windows facing the south. The removal took place about three o'clock in the afternoon, and by four o'clock the following day the older leaves were turned downward so that the tips touched the stem, and at the same time transverse epinastic curvatures had taken place, rolling the leaves so that in two cases the margins touched each other. The younger leaves were in four cases thrown into helicoid curves, reminding one of the circinate vernation in ferns, and in three cases turned down against the stem in the same fashion as the mature leaves. Contemporaneously the shoot had taken a slanting position towards the window—from which the plant was distant a little over seven feet—and finally made an angle of thirty-five degrees with the perpendicular. This strongly epinastic and heliotropic position was maintained for four days, and at the end of this time the plant was returned to the well-illuminated green-house where, after twenty-four hours, the leaves began to resume their normal position, although the axis remained in a heliotropically curved position. After five days had passed the most of the leaves were in the ordinary position, and only one of the oldest preserved any marked traces of its stimulated position. The temperature of the green-house was constant at about 80° F., while that of the lecture-room was variable, running from about 60° F. in the early morning to 74° F. in the afternoon.

The behavior of this Solanum would indicate that even a slight diminution in illumination permits epinastic curvatures to manifest themselves very strongly, but further experiments should be made before it would be possible to refer the position described in this brief note entirely to the diminished illumination.—Conway Macmillan, *University of Minnesota.*

Observations on netted septa in vessels of Tecoma radicans.—In the Centralblatt for 1888 (xxxv. 27), Dr. O. S. Petersen in a brief article, "Über Quernetze in Gefässen," quoted E. Prael's notice of peculiar netted septa across the vessels of Cordia Myxa, and remarks that he had also found the same appearance in Bougainvillæa spectabilis, but that he had seen no other notice of this object except the one published in "Transactions and Proceedings of the Botanical Society of Edinburgh" (xiv. 121–123) by Professor Dickson, who observed it in Bougainvillæa glabra and Testudinaria elephantipes, with characteristics identical with the others described, except that Professor Dickson saw it with the meshes closed, Mr. Prael and Dr. Petersen with the meshes open. As Dr. Petersen's object in writing his note on it was to call attention to the subject and to bring out the record of similar observations, I venture to mention that I have often seen these netted septa in the large vessels of Tecoma radicans, in transverse and radial sections and in the macerated wood, but of the existence of which I find no mention in Hovelacque's very elaborate and carefully worked out paper on Tecoma in his "Recherches sur l'appareil végétatif des Bignoniacées, Rhinanthacées Orobanchées et Utriculariées." They occur not only in the outside normal wood but also in the inner wood formed in the pith, one section sometimes showing in the microscopic field three vessels with these septa across them. I have found them in stems of several years growth and also in the sixth internode of a young shoot, grown in winter by putting some stems, cut from out of doors, in a jar of water and setting them in a warm green-house for three weeks. So far as I have seen, these septa are similar in appearance with those found by Mr. Prael in Cordia Myxa and pictured by him in Pringsheim's Jahrbücher, vol. xix, except that the meshes are rounder and more regular in outline. By treatment with saffranin, I have proved them to be entirely open, for all the lignified cell walls of the section and the strands forming the network of septa were deeply stained while the area of each mesh was perfectly colorless. Dr. H. Solereder, in his work "Über den Systematischen Wert der Holzstructur bei den Dicotyledonen" (p. 17), describes some anomalous forms of septa observed in certain Rosaceæ and Compositæ, but mentions those of Epacris as especially worthy of note, inasmuch as they remind him of the appearance of a sieve plate. I could obtain but one species of this, Epacris paludosa, but so far my search for anything very unusual in its septa has been without result.—O. RODHAM, *Berlin, Germany.*

EDITORIAL.

A BOTANICAL CONGRESS on American soil is yet a thing of the future. Probably there is not an American botanist who does not think that such a gathering would be in the highest degree desirable, provided a considerable number of representative botanists from Europe could be

induced to attend. The presence here of a body of foreign leaders in the science would in itself be an interesting event, and could not fail to have an influence in extending and strengthening the science in this country.

Meetings of this nature are not infrequent in Europe, at which there is usually a fair attendance. But American and European distances are so greatly disproportionate that the single item of travel almost debars all thought of attempting to arrange an international congress with any reasonable hope of securing a satisfactory representation from different foreign countries.

If the purpose is ever accomplished there must be some additional attraction which can be urged in connection with the congress in order to afford a sufficient return for the outlay of time and money required of transatlantic visitors.

Why not make the World's Fair of 1893 the background for such a rally? There is no prospect of a greater attraction for years to come; American botanists are united, and properly organized; and the time is ample for preparation. Will the readers of the GAZETTE express their opinions? Our columns are open to a discussion of the matter.

The good that such a congress can do is not confined to personal enjoyment and the stimulus of direct intercourse, although that may be a delightful and valuable feature of the meeting, but there are important questions affecting the advancement of the science and the whole body of working botanists that can only be settled by a gathering of this kind. Such a question, or rather series of questions, is that of nomenclature, which to straighten out would be worth the effort put forth, even were nothing else accomplished. Questions of identity with their European representatives of many American species of plants difficult to preserve in herbaria, such as the fleshy fungi, can be settled in no way so well as by a conference of specialists with specimens in hand. Questions in geographical botany, methods of physiological research, and a host of lesser problems will present themselves for solution or discussion.

It seems to us that here is a great opportunity, a chance for an epoch-making movement for botany in America. If this should be the opinion of the majority of American botanists, we do not doubt that ways can be devised for making the suggestion a reality.

CURRENT LITERATURE.

Minor Notices.

MRS. E. G. BRITTON writes pleasantly in the February number of the *Microscope* on several mosses found growing in winter in a garden as an "Introduction to the study of mosses."

A SMALL GROUP of ascomycetous fungi, known as *Laboulbeniaceæ*, and

externally parasitic upon insects, has just been monographed by Roland Thaxter.[1] The paper is intended as a preliminary communication on American species, eventually to form a part of a monograph of Entomogenous plants. Two new genera are described (Peyritschiella and Cantharomyces), and eight new species. Peck's *Appendicularia entomophila* is referred to *Stigmatomyces* Karsten. The author requests attention to the following errata: p. 10, lines 1, 26 and 28, for Blidii read *Bledii*; line 21, for Blidius read *Bledius*.

PROFESSOR GEO. F. ATKINSON has published a monograph of the Lemaneaceæ of the U. S.,[2] with three double plates. The author deals with the habitat, the general morphology, the germination of spores, the development of the protonema (prostrate form and Chantransia-form), development of the sexual shoot, development of the reproductive organs, fertilization and development of the carpospores, branching of the sexual shoot, and a presentation, with synonymy and range, of the seven species found in the United States.

WARD'S "*Plant Organization*"[3] is another claimant for attention in the line of blanks for the description of flowering plants. As to method it is a considerable elaboration of the well known Apgar's Plant Analysis with numerous improvements. The first twenty-seven pages give an exhaustive terminology with diagrammatic illustrations, followed by a tabular arrangement of the orders of phanerogams. In both places we object to the prominence given to English terms and names over the technical and scientific, but as both are given the teacher can take his choice. The blanks which follow require most exhaustive examination in order to fill them out completely, being so detailed as to be "fussy." For most classes the time demanded could be spent more profitably in other ways. A special feature is the tying of the blanks in such a way that they can be removed and submitted separately for correction.

NOTES AND NEWS.

THE ANNUAL BANQUET in honor of Henry Shaw will be given at the Southern Hotel, St. Louis, May 26.

MR. W. B. HEMSLEY writes about the genus Asarum in *Gardeners Chronicle* (April 5), and describes three new Chinese species.

DURING THE recent expedition of Sir W. Macgregor to the highlands of New Guinea, a small but very important collection of plants was made at from 8,000 to 13,000 feet altitude. Baron von Mueller has reported on the 64 Phanerogams, 38 of which are found to be new and endemic, and two of these are new genera. Mr. J. G. Baker has just reported upon the Pteridophytes (*Jour. Bot.* April), and of the 70 species collected 18 are new, 11 of which are new species of Polypodium.

[1] Proc. Am. Acad. Feb. 12, 1890, pp. 5–14.

[2] Annals of Botany, vol. iv, no. xiv. May, 1890.

[3] WARD, R. HALSTEAD.—Plant Organization. A review of the structure and morphology of plants by the written method. Second edition, revised. pp. 31, 50 blanks. 7½ x 9½ inches. Boston: Ginn & Co., 1890.

MR. J. G. SMITH, of Lincoln, Neb., sends a sport of Erythronium albidum which has 4 sepals, 3 petals, 8 stamens, and a 4-lobed stigma.

MR. E. CLAASSEN, of Cleveland, Ohio, writes that he has discovered Nelumbo lutea growing abundantly at one locality on the shore of Chippewa Lake, Medina county, Ohio.

MR. ROBERT H. LAMBORN, in the *Am. Naturalist* (April), discusses cypress "knees." He rejects their commonly accepted aërating function and apparently on very good grounds, considering them to be merely so many "trusses" for bracing the roots in holding the tree firmly in yielding material.

THE MEETING of the A. A. A. S. at Indianapolis next August promises to be one of the largest meetings in the history of the Association. Very complete arrangements have been made in the way of entertainment, and the rooms secured in the new State House are everything that could be desired. There will be a great gathering of botanists, as there should be, with a botanist as president. All botanists should make a point of coming, not chiefly to make a botanical crowd, but for the privilege of meeting a great assemblage of botanists.

AT A RECENT meeting of the Linnean Society, of London, Sir John Lubbock gave an abstract of several memoirs. One was "On the shape of the oak leaf," in which an attempt was made to explain the following peculiarities, viz.: The deep rounded sinuses, the lack of symmetry, and the oblong or oblanceolate outline. The author thinks that the sinuses and lack of symmetry are to be explained by the curvature of the leaf in the bud, owing to the shortness of the bud in comparison with the length of the leaf, and the infolding of one edge.

A NEW BIOLOGICAL journal, *Zoe* by name, comes from the Pacific coast, published at San Francisco by the Zoe Publishing Company. The subscription is $2, and the first number speaks well for the new enterprise. The "introduction" speaks of the purpose being to furnish a suitable medium for "the numerous, often unconnected observations, pertaining more particularly to the western part of N. Am." No names of editors appear, but the botany of this first number is as follows: Nomenclature of organic life, by *H. W. Harkness;* An arborescent Polygala, and A Cardon forest, by *T. S. Brandegee;* Notes on the naturalized plants of S. Calif. I, by *S. B. Parish;* Dodecatheon Meadia, by *Katharine Brandegee;* Crossosoma, by *F. H. Vaslit.*

IN HIS interesting monograph of the genus Podaxis (*Jour. Bot.*, Feb. a d Mar.) Mr. George Massee makes the following statement as to geographical distribution: "The species of Podaxis, seven in number, are not abundant anywhere, and being very conspicuous and readily preserved, it is not to be expected that many novelties remain to be discovered, or the range of known species extended to any marked extent. There is a primitive quaintness in the general morphology, which, added to the fact that the known species are confined to geologically old-fashioned places, suggests that we are dealing with the fragmentary remains of a first attempt to emerge from the altogether subterranean habits of the pioneers of our modern group of Gastromycetes. The genus ranges from St. Domingo, California, 116° W. long., to Brisbane, 153° E. long., and from New Mexico, 35° N. lat., to Melbourne, 37° S. lat. All the species are met with in arid, sandy districts." The single American species, is a new one, P. Farlowii, from Arizona and New Mexico.

THE PHILADELPHIA Academy of Natural Sciences, the oldest institution of its kind in America, is about to make an extensive addition to its building. The cost of the improvement is estimated at $239,000, and an appeal for help is made to the friends of the Academy. The botanical fraternity are interested in the movement, as the Academy possesses one of the great American collections of plants, the flowering plants alone numbering over 35,000 species.

DR. GEORGE THURBER'S recent death has called forth an excellent short biographical sketch in *Garden and Forest* (April 9), in which he is said to have been "the most accomplished horticultural writer America has produced." He was born in Providence, R. I., in 1821, and had his botanical interests aroused by Dr. Torrey, through whom he secured the position of naturalist on the Mex. Bound. Survey. His collections were very rich, and among them a new genus of mallows was called Thurberia by Dr. Gray. The chief part of his subsequent life was spent as editor of the *American Agriculturist*, a position which he filled for 22 years, resigning in 1885 on account of failing health. In botany, his name is chiefly associated with the grasses, and it is to be regretted that his ill health and editorial duties did not permit him to prepare the monograph he had intended.

AS A FURTHER contribution to our knowledge of aleurone grains which has been making such rapid advances lately, we note a paper by Franz Lüdtke[1] which gives special attention to the chemical relations of the various parts of the grain. His conclusions are as follows:

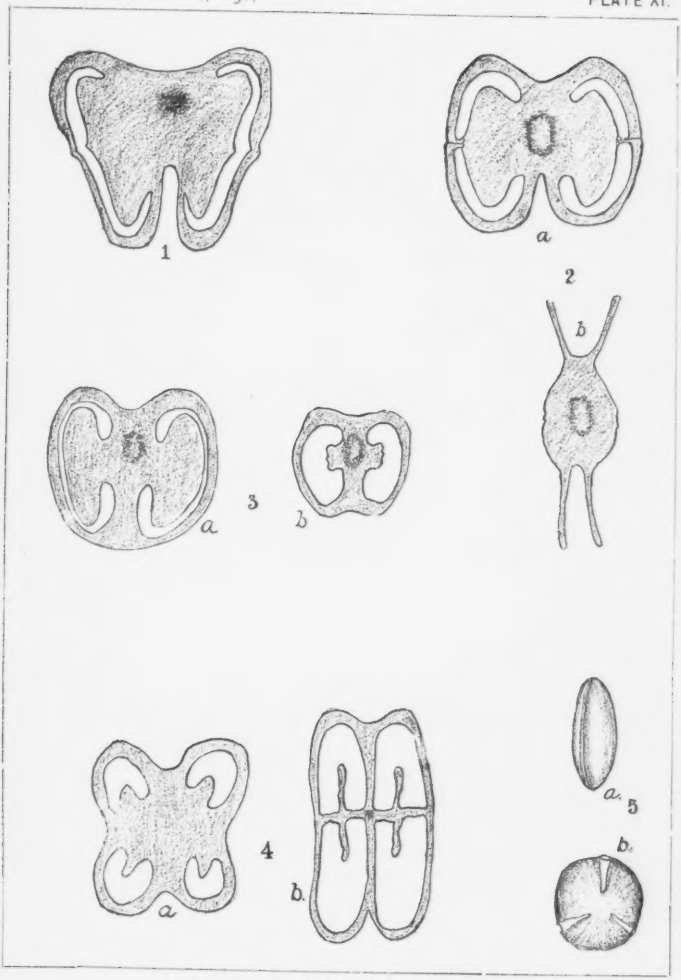
Aleurone grains often contain no inclusions. The membrane and ground-substance (and after a longer time also the globoid and crystals) are soluble in sodic phosphate; the crystalloids are insoluble. Lime water is the best solvent for crystalloids, ground-substance and the membrane. Absolute alcohol (one to two days immersion) is much to be preferred for hardening to the 2 p. c. sublimate-alcohol usually used. Swelling of the resting seeds by water can at most dissolve only the peripheral part of the aleurone grains; the rest is insoluble. The solution of globoids and crystalloids is one of the first effects of germination. The formation of the inclusions does not take place in the vacuoles, but free in the cell contents; their solution occurs partly within the membrane and partly after its solution.

THE FOLLOWING extract from a private letter written by Prof. W. J. Beal gives exact information concerning the recent disaster at the Michigan Agricultural College:

"Last night (March 24) after midnight our botanical laboratory and museum were burned. The fire caught near the top of the building, and gave an opportunity to save all the books, microscopes, charts, and other apparatus, including all the herbarium which was mounted. In an upper room was stored the herbarium of over 7,000 species recently purchased of C. F. Wheeler. This was lost, as were also the electrotypes to partially illustrate my second volume on grasses. The loss of building and cases was about $7,500, and the collection destroyed perhaps $4,000 more. Although the building is gone, hope and courage are still left to myself and three assistants. We expect to have a finer building and a better museum. For the present, very good quarters are given us in a part of the new agricultural laboratory recently built."

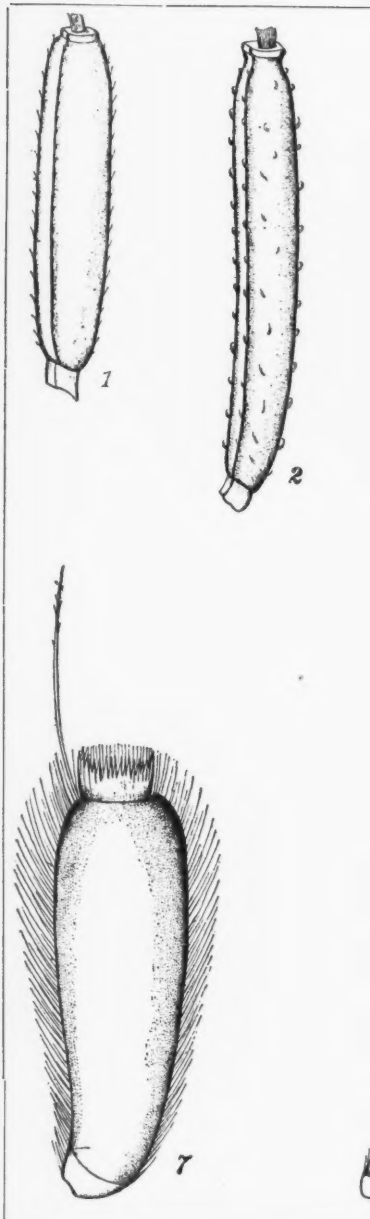
It will be remembered that the building destroyed was illustrated in the GAZETTE for December, 1885.

1 Prings. Jahrb. f. wiss. Bot. xxi. 61–127, pl. ii–iv.



HALSTED on SOLANACEOUS STAMENS.

RHACHIDOSPERMUM MEXICANUM Vasey.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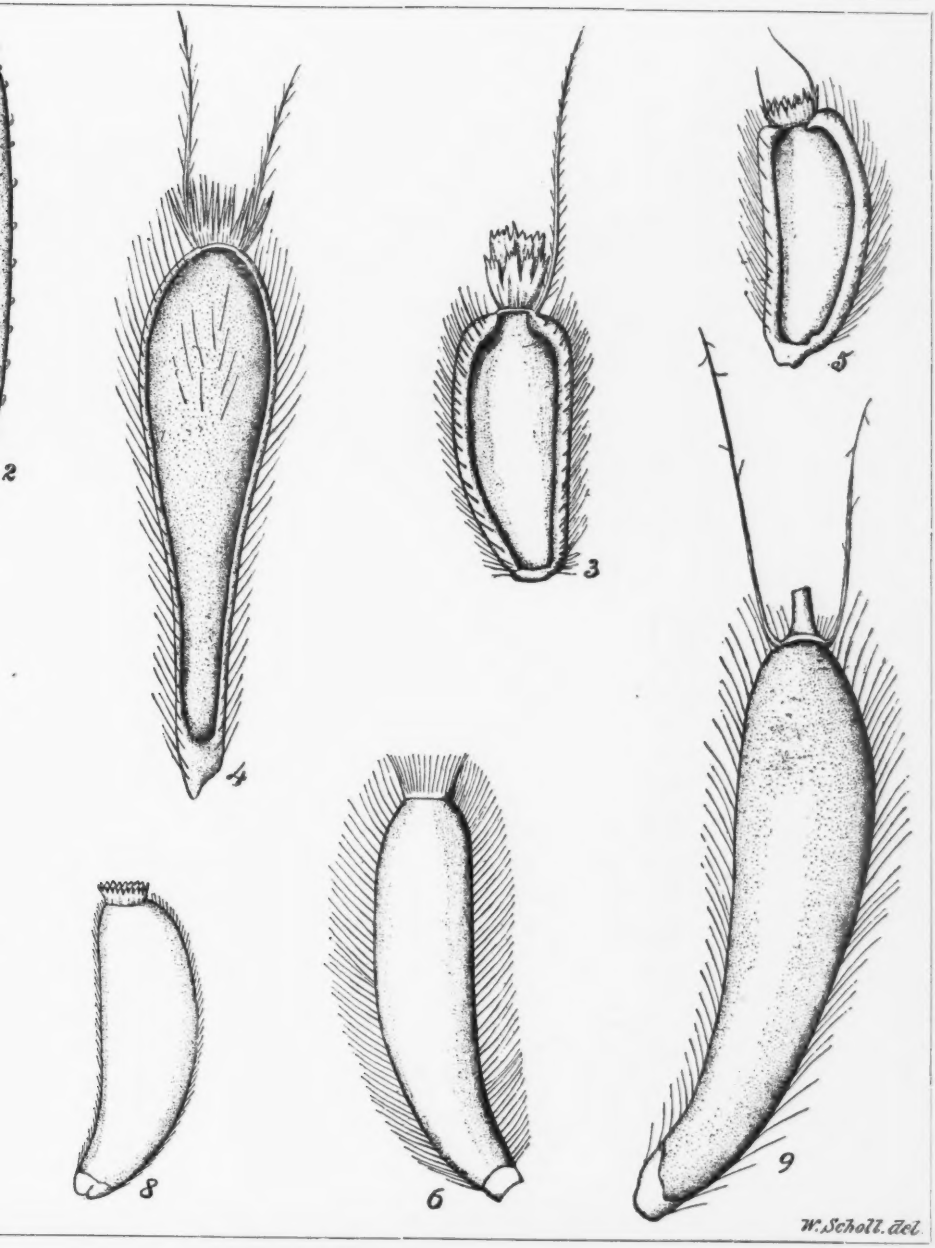
7



ROSE ON PERITYLE.